EXECUTIVE SUMMARY

State, local, Tribal, and Federal agencies currently use various methods to estimate risks to human health from the consumption of chemically contaminated, noncommercially caught fish and shellfish. A 1988 survey, funded by the U.S. Environmental Protection Agency (EPA) and conducted by the American Fisheries Society, identified the need for standardizing the approaches to evaluating risks and developing fish consumption advisories that are comparable across different jurisdictions (Cunningham et al.,1990, 1994). Four key components were identified as critical to the development of a consistent risk-based approach: standardized practices for sampling and analyzing fish, standardized risk assessment methods, standardized procedures for making risk management decisions, and standardized approaches to risk communication (Cunningham et al., 1990).

To address concerns raised by the survey respondents, EPA has developed a series of four documents designed to provide guidance to State, local, Tribal, and Regional environmental health officials responsible for issuing fish consumption advisories. The documents are meant to provide guidance only and do not constitute a regulatory requirement. The documents are:

Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories
Volume 1: Fish Sampling and Analysis
Volume 2: Risk Assessment and Fish Consumption Limits
Volume 3: Overview of Risk Management
Volume 4: Risk Communication.

Volume 1 was first released in September 1993 and a second edition followed in September 1995. Volume 2 was first released in June 1994. Volume 3 was released in June 1996, and Volume 4 was released in March 1995. It is essential that all four documents be used together, since no single volume addresses all of the topics involved in the development of risk-based fish consumption advisories.

The objective of *Volume 2: Risk Assessment and Fish Consumption Limits* is to provide guidance on the development of risk-based meal consumption limits for 25 high-priority chemical contaminants (target analytes). The target analytes addressed in this guidance series were selected by EPA's Office of Water as particularly significant contaminants, based on their documented occurrence in fish and shellfish, their persistence in the environment, their potential for bioaccumulation, and their oral toxicity to humans. The criteria for their selection are discussed in Section 4 of Volume 1 of this series.

In addition to presenting monthly consumption limit tables, Volume 2 discusses risk assessment methods used to derive the limits and discusses procedures used to modify these limits to reflect local conditions. A toxicological profile summary for each of the target analytes presenting current toxicity data is also provided. Additional sources of information are listed for those seeking a more in-depth discussion of risk assessment methods.

The first edition of Volume 2 was reviewed by experts at the Federal, State, Tribal, and local levels who were members of the Fish Contaminant Workgroup. These individuals contributed significant technical information and guidance during the development of this document. Their input was used to revise the document to make it more useful and informative to public health professionals. The workgroup was not involved in reviewing this second edition because the basic risk assessment procedures had already been approved. This second edition was issued to update toxicological information for several of the target analytes, incorporate existing supplemental information into the body of the document, and reformat the previous edition.

This second edition provides risk assessors and managers with the most current toxicological information for the target analytes and deletes carbophenothion as a target analyte. This second edition has been reorganized to provide users with

- Detailed information on risk assessment methods including new information on population exposure, fish consumption patterns, consumption surveys, risk reduction through the use of various preparation and cooking procedures, and risk characterization (Section 2)

- Concise information on how the monthly consumption limits tables were developed and step-by-step instructions on how thesetables can be modified to reflect local site-specific conditions for specific populations of concern (Section 3)

- Monthly consumption tables for adults and children for all 25 target analytes, and separate tables for women of reproductive age for methylmercury and polychlorinated biphenyls (PCBs), that provide fish contaminant concentrations ranging from no consumption limits (<6 meals per year) to safe consumption (>30 meals/month) limits (Section 4)

- A toxicological profile summarizing relevent toxicity data for each target analyte including new toxicological information for methylmercury, PCBs, inorganic arsenic, tributyltin, and polyaromatic hydrocarbons (PAHs) (Section 5)

- A brief discussion of geographic information system (GIS) mapping tools for risk assessment and risk management (Section 6).

The information in this document may be used in conjunction with contaminant data from local fish and shellfish sampling programs and fish consumption surveys

(or from fish consumption data provided inAppendix D), to select or calculate risk-based consumption limits for contaminated noncommercially caught fish and shellfish. The consumption limits may be used with other types of information (e.g., cultural and dietary characteristics of the populations of concern, social and economic impacts, and health issues, including benefits of fish consumption and accessibility of other food sources) to establish health advisories. The decision-making process for the development of fish advisories is discussed in the risk management document in this series (Volume 3).

EPA welcomes your suggestions and comments. A major goal of this guidance document series is to provide a clear and usable summary of critical information necessary to make informed decisions concerning fish consumption advisories. These documents are published in binder form so that they can be easily revised and updated as significant new information becomes available. We encourage comments and hope this document will be a useful adjunct to the resources used by States, local governments, and Tribal organizations in making decisions concerning fish advisories.